TWO NEW SPECIES OF BEES FROM ARIZONA
(Hymenoptera, Apoidea)[1]

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The types of the new species here described are included in the collection at the University of California Citrus Experiment Station, Riverside.

Heriades (Neotrypetes) micheneri Timberlake, new species

In Michener's table of *Neotrypetes* (Ann. Ent. Soc. Amer., 31:517, 1938), the female runs to *variolosa* (Cresson) and differs in having a broad, very shallow emargination in clypeal margin, armed with five small denticles; punctures of frons coarser than those of mesoscutum; and abdominal bands very narrow and absent on the fifth tergite. The male runs to *leavitti* Crawford in the same table, but differs in having the first ventrite truncate at apex, hardly produced, and armed on its disk with a large conical process that ends very bluntly, as seen both from behind and from the side. The process, therefore, is much like that of *carinata* Cresson, which belongs to a different group.

Female. Black, the apex of last joint of tarsi and claws brownish testaceous. Apex of mandibles, tegulae, and smooth inner surface of legs more or less tinged with dark reddish. Mandibles not broadened at apex, twice as long as wide, the two carinae on outer surface parallel, but uniting close to the apex. Cutting edge of mandible tridentate. Clypeal margin very broadly truncate, with a slight broad median emargination armed with five small denticles. Punctures of frons and vertex very coarse and close, with those of face below antennae and of cheek much smaller. Punctures of mesocutum, scutellum, and mesopleura coarse and close but slightly smaller than those of frons. Punctures of abdomen coarse and close, becoming coarser and shallow on tergite 3, where they are nearly as coarse as those of thorax. Pubescence very fine, short and inconspicuous, except for patches of white plumose hair on sides of face, pronotum, area around tubercles and base of wings, and on apical margin of scutellum and suture between

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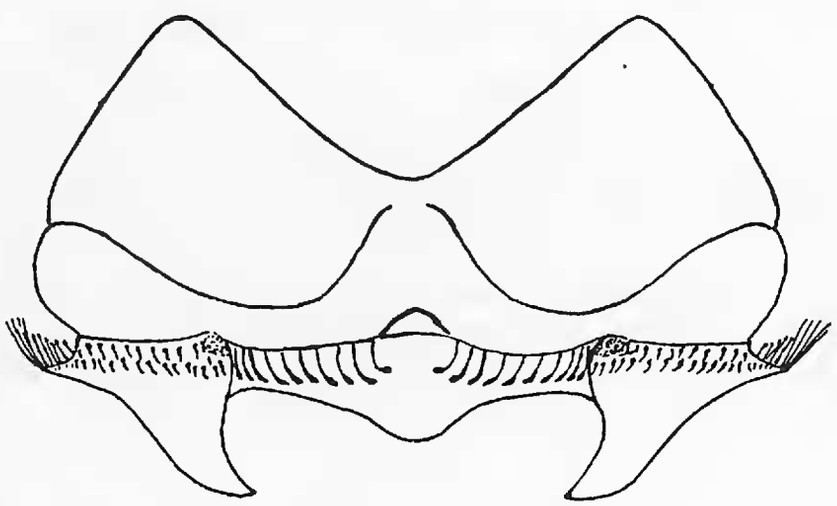
meso- and metapleuron. Hair of legs short and scanty, except on tarsi; that on inner side of hind tarsi long, abundant, and pale fulvous. Apical hair-band on tergites 1 to 4 white and very narrow, except that the one on first tergite is considerably widened on each side. These bands composed of small scalelike hairs, with microscopic plumosity. Scopa white. Wings uniformly grayish dusky, with dark fuscous nervures and stigma. Length, 5.25 mm.; anterior wing, 3.5 mm.

Male. Similar to female in puncturation and pubescence. Front femora, except behind, and front tibiae reddish ferruginous. Apical joint of front tarsi entirely ferruginous. Anterior side of middle femora dark reddish. Mandibles narrow and bidentate. Clypeal margin simple. Face more narrowed than in female. Punctures of head and thorax a little less coarse and dense. Punctures of first two tergites as in the female; those of the third a little



coarser but not shallow as in the female. Femora strongly swollen (much more so than in *variolosa* and other species). Front tarsi short and broadened, the first joint about twice as long as wide, the three middle joints very short and strongly bilobate about as in *bruneri* Titus. Face between antennae and clypeus covered with white plumose hair. Dense white hair also on anterior part of cheeks, especially the gular region, on the coxae, the apical part of first ventrite, and disk of second ventrite. Front tarsi with a white fringe behind, and hair on inner side of hind tarsi whitish. Apical bands of white scalelike hairs on abdomen present only on tergites 1 to 3, and not widened at sides of first segment. Fifth ventrite (fig. 1) deeply and broadly emarginate at apex, the emargination formed by a large triangular lobe on each side, the tips of lobes acute and curved inward. A small acuminate tooth on outer side of base of these lobes. Base of the emargination armed with a transverse band of rather short, erect, curved hairs, which are strongly capitate at apex, except a few longer hairs at tips of the lateral teeth. Sixth ventrite as in allied species, the triangular apical part having a patch of fine, long hairs on each side. Length, about 5 mm. (or 6.5 mm. with abdo-

men extended to expose the ventral segments); anterior wing, 3.7 mm.

Described from a pair (*holotype* female and *allotype*) taken on damp sand, PATAGONIA, ARIZONA, August 8, 1940 (Timberlake).

Named for Charles D. Michener, who has given us an excellent revision of North American *Heriades.*

Calliopsis squamifera Timberlake, new species

Allied to *andreniformis* Smith and *rhodophila* Cockerell, but differs in the white face markings and very long slender middle tarsi. It is probably closer to the little-known *teucrii* Cockerell, the female of which has white markings, but differs from *squamifera* in larger size, piceous tegulae, and dusky wings.

Male. Black, the mandibles, except reddish tips, labrum, and face below antennae, white. Supraclypeal and lateral marks extending above level of antennae almost exactly as in *andreniformis.* Scape broadly in front, interrupted band on hind border of pronotum, and tubercles, yellowish white. Flagellum, a large quadrate area on middle of mesosternum, and legs lemon-yellow, the tarsi being a little more brownish, and apical joint of hind pair dusky. Flagellum dusky behind, the obscurity more pronounced on basal joints and there extending further around the joints. Scape behind and pedicel black. Narrow apical depression of tergites testaceous brown. Tegulae pale testaceous with a white dot. Wings nearly clear, the neuration pale testaceous brown. Large callus-like areas on metanotum pale grayish-brown (described more in detail below). Form more slender than in *andreniformis.* Head broader than thorax, somewhat broader than long, with the inner orbits of eyes slightly converging below. Clypeus not prominent as in *andreniformis.* Legs slender, nearly as in *rhodophila* and *andreniformis,* except that the middle tarsi are extremely slender and elongate. Recurrent nervures received at nearly equal distances from base and apex of second submarginal cell. Punctuation similar to that of *andreniformis,* but the dark part of frons with relatively coarser, shallow, and subconfluent punctures, mesoscutum a little more sparsely punctured, and mesopleura nearly impunctate. Pubescence white, nearly as in *andreniformis,* except that the hairs of clypeus are less bristle-like. Length, 4 mm.; anterior wing, 2.8 mm.

Holotype, a male, at flowers of *Euphorbia,* PICACHO PASS, ARIZONA, August 7, 1940 (Timberlake). The type was taken with a small series of *Calliopsis* (*Perissander*) *anomoptera* Michener, at the type locality of the latter species.

The males of the typical group of *Calliopsis* (the male of *teucrii* being unknown) may be distinguished by the following key:

1. Face yellow; middle tarsus no more than twice as long as tibia; callus-like areas of scutellum and metanotum black.....2
– Face white; middle tarsus about thrice as long as tibia; callus-like areas of scutellum and metanotum pale grayish-brown..... *squamifera*
2. Legs and scapes yellow; clypeus convexly prominent in middle; callus-like areas of metanotum small and widely separated *andreniformis*
– Scape black, or at most with a slender yellow line in front; femora black, except at apex, and tibiae with a black patch behind; callus-like areas of metanotum very large and contiguous; clypeus less prominent..... *rhodophila*

The callus-like areas of scutellum and metanotum of the male in the typical group of *Calliopsis* are reported here for the first time, I believe. These areas in *rhodophila* and *andreniformis* are opaque black and densely covered with extremely short, moss-like pubescence. In the latter species the areas are comparatively small, those on scutellum being easily hidden by the wings, as they occupy the depression between the disk of scutellum and base of hind wings. Posterior border of areas on scutellum yellowish white, with a little patch of whitish hair. Areas on metanotum cover all but the median fifth of the segment, the middle part being subpulvinate and provided with long, erect hairs.

In *rhodophila* the areas on scutellum are large, so that the exposed disk covers rather less than one-third of the total width of segment, and as seen from in front or behind its surface is slightly below that of the somewhat protuberant lateral areas. The latter are pale testaceous or whitish on the hind border as in *andreniformis*. The areas on metanotum are extremely large in *rhodophila*, and subquadrate, extending about two-thirds of the distance from base of metanotum to apex of propodeum. They appear to extend far over the base of the propodeum, and are contiguous except on the basal half, where there is a very narrow line of the normal metanotum exposed and provided with a tuft of long hair.

In *squamifera* the peculiar areas are pallid and covered with fine, shingled, or overlapping scales. The areas on the scutellum are small and restricted to the lateral impressed part of the scutellar sclerite, as in *andreniformis*. On the metanotum they are

large and broadly oval, not quite meeting medially, with the constricted hairy area at base in the form of an equilateral triangle. They reach a little more than half way from base of metanotum to apex of propodeum.

I have seen similar structures, but apparently glabrous, and hence more callus-like, on the scutellum and metanotum of the male of a small undescribed species of *Nomadopsis* from Texas.

SOME RECORDS OF PARASITISM OF SOLITARY BEES BY CONOPID FLIES

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Conopid flies have been observed in the field to attempt oviposition in many species of bees including *Apis mellifica* L. In addition, the considerable variation in size among the individuals of a single species may also indicate a lack of host specificity.[1] However, many records of successful parasitism will have to be collected before a clear picture of the degree of host specificity can be obtained. For this reason the following observations are placed on record.

Three dead adults of *Andrena viereckı* Ckll., each with a conopid puparium in its abdomen, were taken from burrows in a small nesting site of this bee at Berkeley, California, on March 14, 1939. During the following spring, adults of *Myopa rubida* Bigot emerged from two of the specimens. The same conopid species was observed striking *Diandrena chalybioides* Viereck and *Andrena complexa* Viereck on flowers of buttercup, *Ranunculus californicus* Bentham, one mile west of Orinda Crossroads, Contra Costa County, California, on April 11, 1946. When a series of these two species of bees were taken into the laboratory and dissected, two out of eight of the *Diandrena chalybioides* had a small dipterous larva attached to the outer wall of the foregut, although twenty-five *Andrena complexa* contained neither eggs nor larvae of the parasites.

One dead female of *Panurginus melanocephalus* Ckll., containing a conopid puparium was taken from a burrow at Berkeley on March 16, 1939. Although the fly did not emerge from the bee, upon dissection it was recognizable as a member of the genus *Zodion*.

[1]Bohart, G. E., 1941. The oviposition of conopid flies upon smaller andrenid bees. Pan-Pac. Ent., 17(2):95-96.